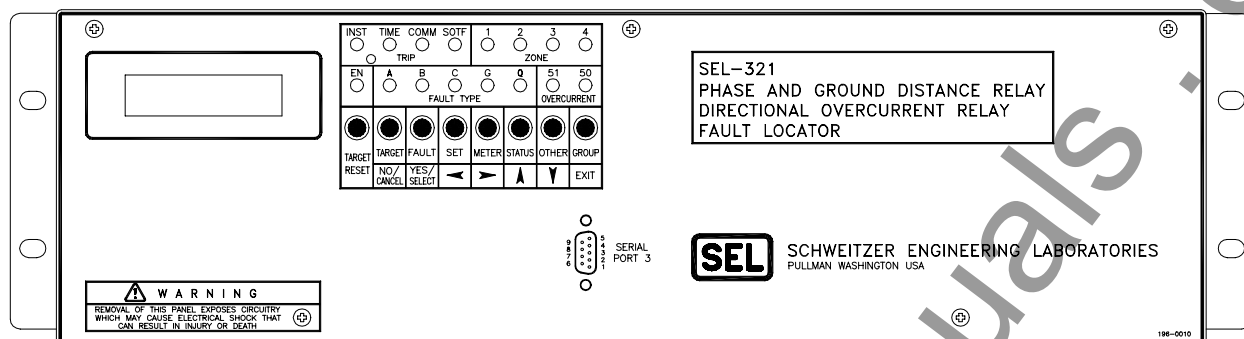




# SEL-321 Data Sheet



## *Phase and Ground Distance Relay, Directional Overcurrent Relay, Fault Locator*

- Four Zones of Phase and Ground Distance Protection:
  - Mho characteristic phase elements
  - Mho and quadrilateral characteristic ground elements
- Supports all standard tripping schemes
- Phase, negative-sequence, and residual overcurrent protection
- Two independent negative-sequence directional elements
- Apply to single- and three-pole trip installations
- Out-of-step tripping and blocking logic
- Unique load-encroachment logic
- Oscillography data and an eleven-cycle event report
- Up to sixteen contact outputs and eight contact inputs in the One I/O Board version
- Up to thirty-two contact outputs and sixteen contact inputs in the Two I/O Board version
- SELOGIC® control equations
- Six selectable setting groups
- Three serial communications ports
- Front-panel setting and display
- Automatic self-testing; Fault locating; Metering

SCHWEITZER ENGINEERING LABORATORIES  
2350 NE Hopkins Court • Pullman, WA • 99163-5603 • USA  
Phone: (509) 332-1890 • Fax: (509) 332-7990  
E-mail: info@selinc.com • Internet: www.selinc.com



## GENERAL DESCRIPTION

The SEL-321 Relay protects, controls, and monitors EHV, HV, and subtransmission lines. The relay contains all protective elements and control logic to protect any overhead transmission line.

The relay is a complete protective relay package for pilot and non-pilot schemes. The following list highlights a few of the protective features in the SEL-321 Relay.

- Four zones of phase and ground distance protection
- Independent internal, user-settable timers delay Zone 2, 3, or 4 phase and ground elements for time-stepped coordination with downstream relays
- Any zone may be set forward or reversed
- Independently set phase and ground distance elements
- Ground distance can be selected for mho characteristic, quadrilateral characteristic, or both
- Quadrilateral characteristic on ground distance element adds sensitivity for high-resistance faults, compensates for load flow, and prevents over- and underreaching
- Positive-sequence memory polarization provides expanded resistive coverage for phase and ground faults
- Independent phase, negative-sequence, and residual time-overcurrent elements
- Four levels of instantaneous/definite time negative-sequence and residual overcurrent elements
- Typical operating time of one cycle for three-phase faults
- Oscillography and event reporting data
- Front-panel setting and display

### SEL-321 Relay Benefits

The relay offers a large number of protective elements and features. You tailor the relay to your particular application using SELOGIC control equations to select specific functions.

If your protection requirements change, the relay is readily adapted by entering new settings. The logic required for the new scheme is enabled, and those settings are entered. This allows change or expansion at no cost since additional protective relays or logic cards are not required.

The relay has six independent setting groups. With this increased flexibility, the relay may be configured for virtually any operating condition: substitute line relay, line configuration changes, source changes, etc.

Benefits gained using the SEL-321 Relay include:

- Application flexibility
- Simplified settings: set only the elements you are using
- Relay is readily expanded to more complex schemes at no cost
- SELOGIC control equations allow you to program the relay to meet any application needs
- Fault locator reduces patrol and outage time

- Communications handle remote interrogation
- Self-testing increases relay availability

## APPLICATIONS

### Versatility

The SEL-321 Relay handles all overhead line protective relaying applications because it is both versatile and economical. The programming versatility of the relay allows use in pilot and non-pilot schemes.

The relay fits a large number of applications. Basic schemes can be implemented by only selecting the elements used for that relay application. For more complex schemes, select more protective elements.

### Communication Schemes

The SEL-321 Relay is the ideal relay for use in communications-based schemes. Dedicated SELOGIC control equations allow selection of relay elements to perform specific functions when external conditions are met. In addition to the communication scheme logic, the SEL-321 Relay provides time-stepped backup protection without the need for external wiring modifications or dedicated input contacts.

The SEL-321 Relay overcomes typical deficiencies associated with communications-based schemes. Most communications-based schemes are vulnerable to conditions that may result in an incorrect trip if logic is not provided to account for them.

For example:

- Current reversals
- Weak-infeed conditions at one terminal
- Breaker open at one terminal
- Switch-onto-fault conditions

While communications equipment circuitry may account for these shortcomings, it may not be available for applications where only the protective relaying is being upgraded, or when dependence on this external circuitry is neither economical nor desirable.

The SEL-321 Relay logic accounts for the deficiencies listed above. If the communication channel is lost or out of service, time-step backup protection is provided without special switching or detection schemes. The SEL-321 Relay is capable of supporting permissive overreaching transfer trip scheme, direct and permissive underreaching transfer trip schemes, direct transfer trip schemes, and directional comparison blocking and unblocking schemes.

### Obsolete Relay Replacement

The SEL-321 Relay is an ideal replacement for aging or obsolete electromechanical relays. If protective relays are to be upgraded at one terminal only, it is important that relays have measuring principles compatible with surrounding terminals.

Compact size and simple field wiring make replacement of electromechanical relays with an SEL-321 Relay especially convenient in crowded substations. Both horizontal and vertical mounting configurations are available. The required panel cutout dimensions are equivalent to that of a single electromechanical distance relay, which eliminates panel cutting where relays already exist. Event-reporting and fault-locating features economically provide valuable engineering and operating information, eliminating the need for event recorders and oscillographs in most applications. A negligible instrument transformer burden makes the SEL-321 Relay an attractive alternative for overburdened current and potential transformers.

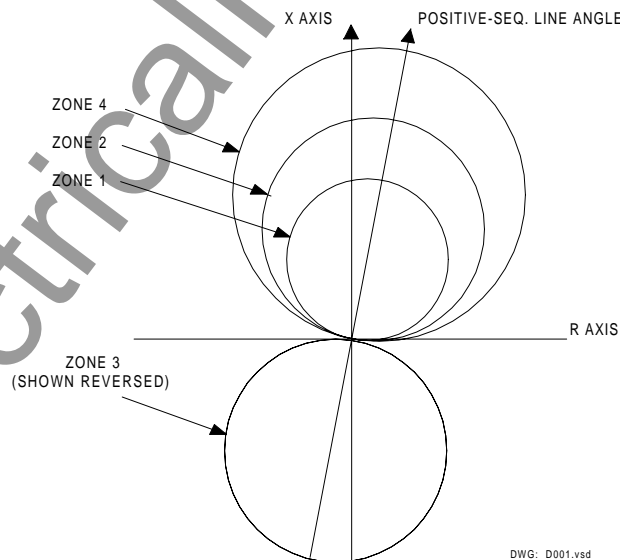
Applications include:

- Single- or multiple-zone relaying schemes
- Time-stepped distance schemes
- Communications assisted schemes
- Single- and three-pole tripping
- Overcurrent protection with phase or ground distance supervision
- Replacement of electromechanical relays
- Substitute line relay

## OPERATING PRINCIPLES

### Mho Distance

The SEL-321 Relay uses mho characteristics for phase and ground distance protection. Figure 1 illustrates the impedance characteristics of the phase and ground distance elements.

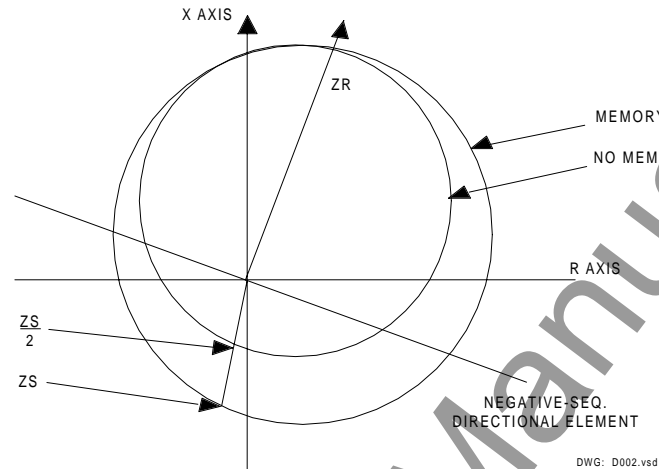


**Figure 1: Phase and Ground Mho Distance Characteristics**

All mho elements use positive-sequence memory polarization that expand in proportion to the source impedance, and provide positive, secure operation for close-in faults.

Figure 2 shows the forward-reaching mho characteristic for a forward phase-to-phase fault. The mho circle expands to the source impedance  $Z_S$ , but never more than the set relay reach,  $Z_R$ .

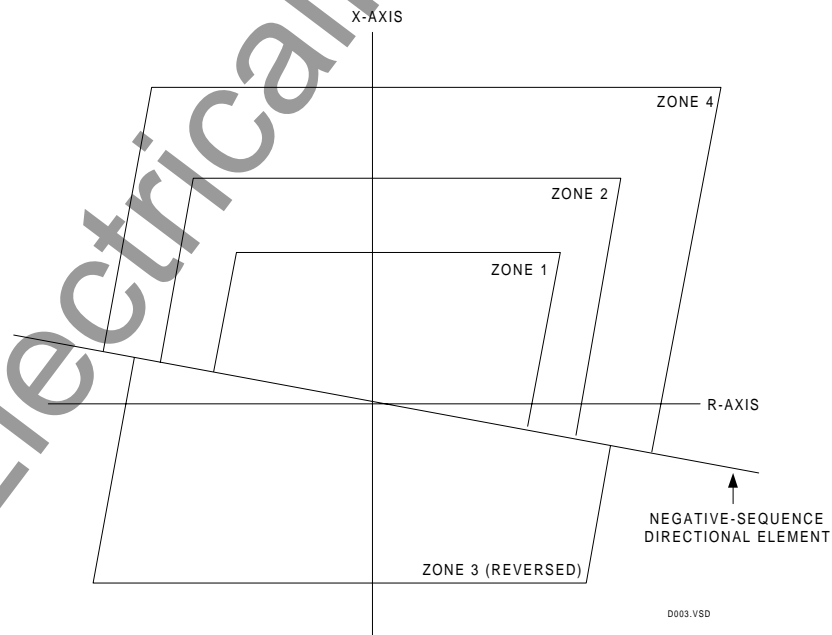
Positive-sequence memory polarization provides added security during the open-pole period when used in single-pole trip applications.



**Figure 2: Phase-to-phase Element Response for a Forward Phase-to-Phase Fault**

### Quadrilateral Distance

The relay also provides ground quadrilateral characteristics. The top line of the quadrilateral characteristic compensates for load flow to avoid under- and overreaching. The ground mho and quadrilateral distance elements may be used individually or concurrently.



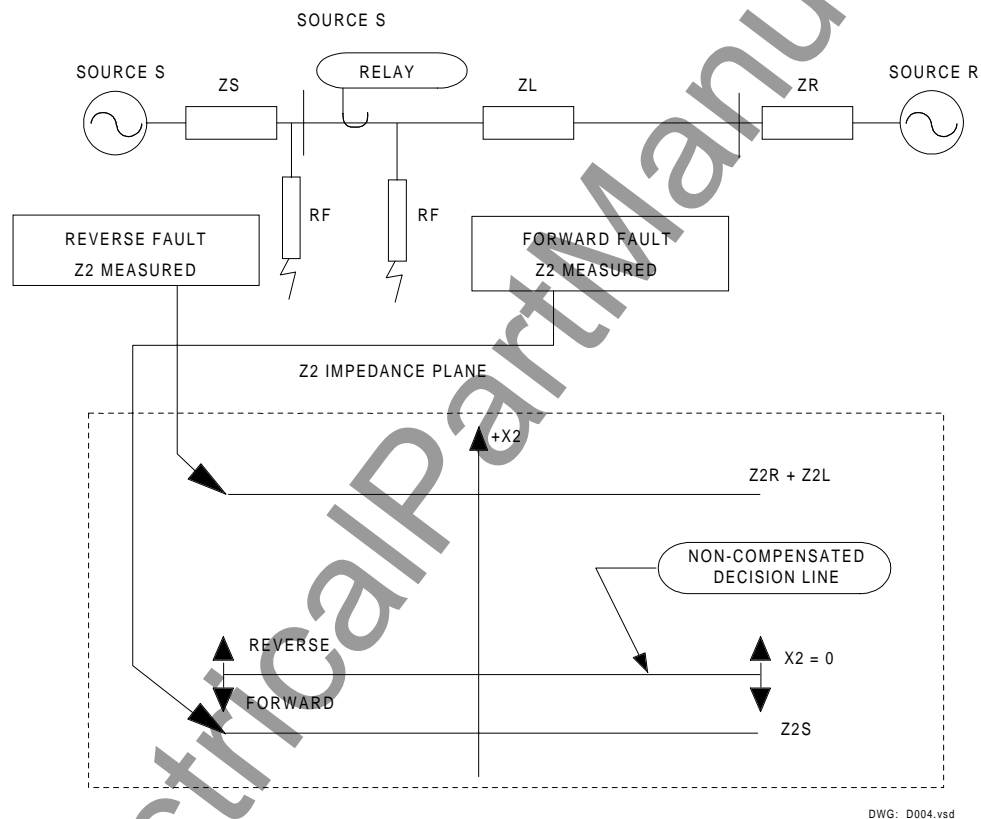
**Figure 3: Quadrilateral Ground Distance Characteristics**

## Overcurrent Elements

Phase, negative-sequence and residual overcurrent elements provide primary or backup protection. Phase and ground distance elements can supervise the overcurrent elements for greater selectivity.

## Negative-Sequence Directional Element

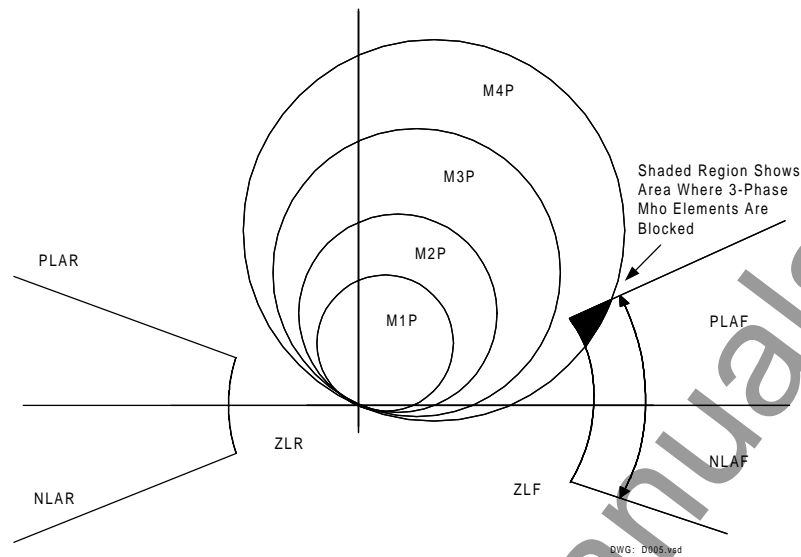
The relay uses a unique negative-sequence directional element, which calculates the negative-sequence impedance at the relaying point. Thresholds are set that declare the fault in the forward or reversed direction. Figure 4 illustrates the negative-sequence directional measurement technique.



**Figure 4: Negative-Sequence Directional Element Measurement**

## Load Encroachment

A load-encroachment feature prevents operation of the phase distance elements under high load conditions. This unique feature permits load to enter a predefined area of the phase distance characteristic without causing a tripout. Figure 5 shows the load-encroachment characteristic.



**Figure 5: Load-Encroachment Characteristic**

### Scheme Selection

With a simple setting, any of the four zones of phase and ground distance protection may be set in the forward or reverse direction. The number of phase or ground distance zones is selectable.

Select mho and/or quadrilateral characteristic for ground distance. Mho elements give speed; quadrilateral elements give sensitivity. Each of the eight ground elements has its own reach setting.

### Ground Distance Elements

The ground distance elements include two zero-sequence compensation factors ( $k_01$ ,  $k_0$ ). This allows compensation for remote faults when there are intermediate sources of zero-sequence current; such as lines with tapped transformer banks with a grounded-wye configuration.

### Time-Overcurrent Elements

There are three independent time-overcurrent elements: phase for backup phase fault protection, negative-sequence for sensitive phase-to-phase fault detection or ground fault detection, and residual for ground fault detection.

### Torque Control

The phase overcurrent element may be torque-controlled by the Zone 2 phase distance elements. The negative-sequence and residual overcurrent elements may be torque-controlled by the Zone 2 ground distance or negative-sequence directional elements.

### Negative-Sequence/Residual Overcurrent

There are four levels of instantaneous/definite time negative-sequence and residual overcurrent protection. Each level provides backup protection. The instantaneous output of each level finds use in the communications scheme and control logic.

## Communications-Based Schemes

The relay supports the following communications-based protection schemes:

- Permissive Overreaching Transfer Trip (POTT)
- Permissive Underreaching Transfer Trip (PUTT)
- Directional Comparison Unblocking (DCUB)
- Directional Comparison Blocking (DCB)
- Direct Underreaching Transfer Trip (DUTT)
- Direct Transfer Trip (DTT)

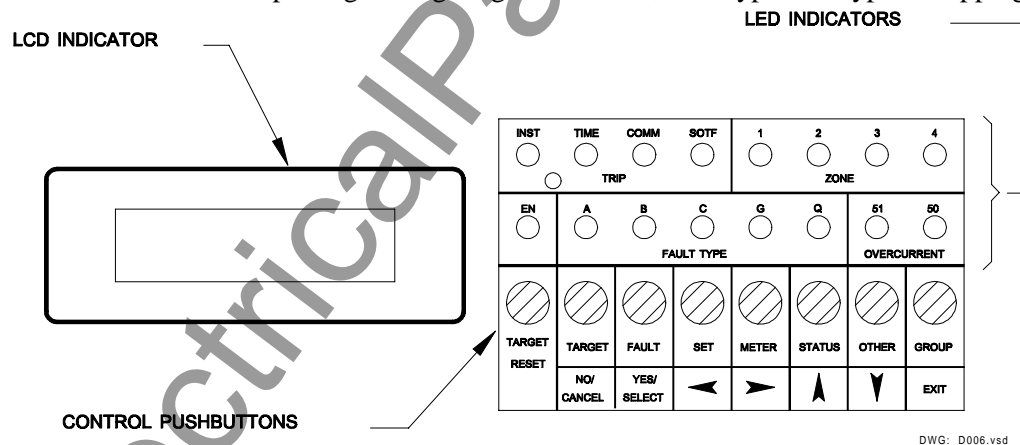
Current reversal logic provides for POTT, DCUB and DCB scheme applications. To preserve the security of the parallel healthy line, the relay uses reverse Zone 3 elements, timers and associated logic to block permissive tripping in POTT and DCUB schemes. In DCB schemes the block trip signal transmission time is extended to allow time for the remote Zone 2 elements to drop out.

## ADDITIONAL FEATURES

### Front-Panel Display

The LCD display, Figure 6, gives detailed information pertaining to a fault detected by the relay, by displaying meter information, relay self-test status information, and setting parameters.

Sixteen LEDs on the front panel give targeting information, fault type, and type of tripping.



**Figure 6: SEL-321 Relay Front-Panel Layout**

### Serial Communications Ports

The relay has three serial communications ports for local or remote access to relay settings, meter, and fault data. Two serial ports are on the relay rear panel, and a local interface port is provided on the relay front panel. Remote communications allow operators to retrieve relay fault and meter information from a central control station.

A multi-level password security scheme impedes unauthorized access to the relay. A lower level password allows examination of relay settings, meter data, and event records. Setting changes are



available only from the upper password level. Line breaker control functions are also protected with a third level of password protection.

The relay does not require special communications software. Dumb terminals, printing terminals, or a computer supplied with terminal emulation and a serial communications port is all that is required.

### Event Reporting and Oscillography

The relay generates an eleven-cycle event report following each system disturbance detected by the relay or upon command. The report provides four cycles of prefault data and seven cycles of postfault data. The data in each report include voltages, current, relay element status, and relay inputs and outputs. The report also includes the calculated fault location, date and time of the event.

This information simplifies postfault analysis and improves understanding of simple and complex protective scheme operation. The relay stores the last twelve event reports for local or remote retrieval.

Two formats of event reports are available. The default event report allows you to quickly review a routine relay operation. This event report displays the important voltage, current, protective element status, input and output contact status in quarter-cycle increments.

The long form event report format is available in the form of an ASCII hexadecimal data record. This second format contains all data captured by the relay in one-sixteenth cycle increments for the full eleven cycles. The ASCII Hex data is also used for oscillography with the SEL-5601 program.

### SELOGIC Control Equations

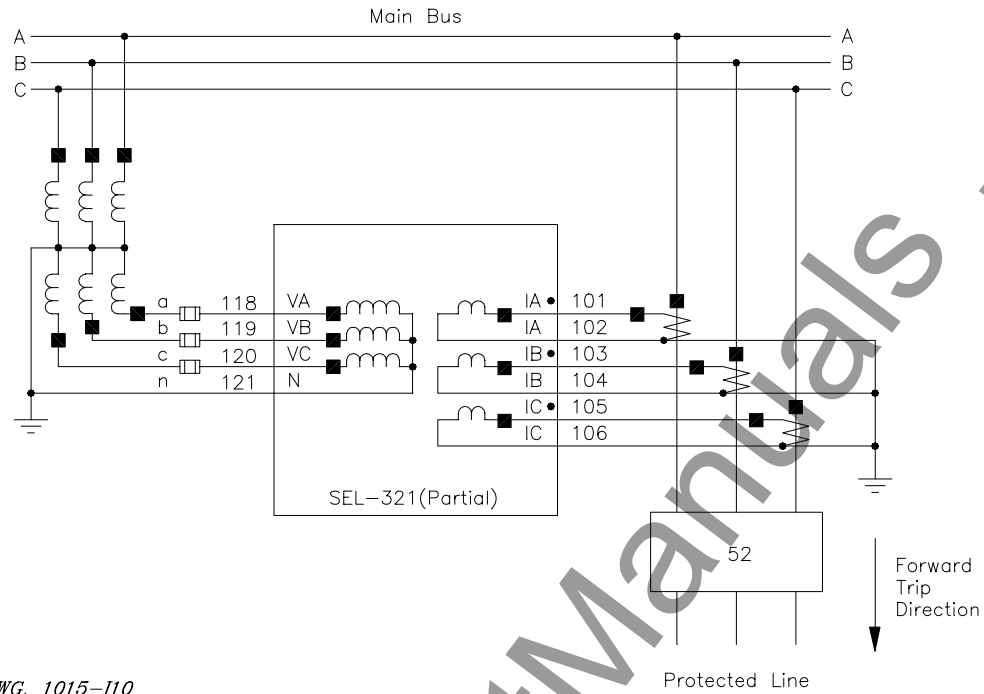
SELOGIC control equations put relay logic in the hands of the relay application engineer. Assign the relay inputs to suit your application, logically combine selected relay elements for various control functions, and assign output relays to your logic functions.

Programming SELOGIC control equations consist of ANDing, ORing, or inverting the individual Relay Word elements. Any element in the Relay Word can be used in the SELOGIC control equations.

Configure the contact outputs to operate when any of the protective elements and logic outputs assert. Implement complete protective schemes using a minimum of wiring and panel space. Programmable contact closure simplifies testing by indicating pickup and dropout of only those elements under test.

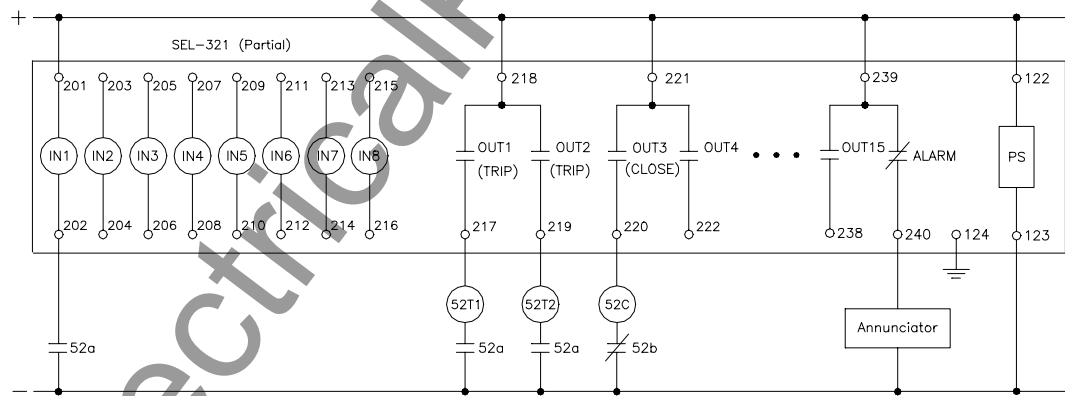
### Contact Inputs and Outputs

The SEL-321 Relay series provides eight contact inputs and sixteen contact outputs in the one I/O board version. A two I/O board version is available with sixteen contact inputs and thirty-two contact outputs. The contact inputs are assignable for control functions, monitoring logic, and general indication. Except for a dedicated alarm output, each contact output is independently programmable using SELOGIC control equations. All relay output contacts are rated for trip duty.



DWG. 1015-I10

**Figure 7: SEL-321 Relay External AC Current and Voltage Connections**



NOTE: All Inputs and Outputs are Assignable.

DWG. 1015-I21

**Figure 8: SEL-321 Relay External DC Connection Diagram (Typical – One I/O Board Version Shown)**

## TECHNICAL SPECIFICATIONS

### General Specifications

<b>Voltage Inputs</b>	67 V <sub>L-N</sub> , three-phase four-wire connection. 150 V <sub>L-N</sub> continuous (connect any voltage from 0 to 150 Vac). 365 Vac for 10 seconds. Burden: 0.13 VA @ 67 V; 0.45 VA @ 120 V.
<b>Current Inputs</b>	5 A nominal: 15 A continuous, 500 A for 1 second, linear to 100 A symmetrical. 1250 A for 1 cycle. Burden: 0.27 VA @ 5 A, 2.51 VA @ 15 A.  1 A nominal: 3 A continuous, 100 A for 1 second, linear to 20 A symmetrical. 250 A for 1 cycle. Burden: 0.13 VA @ 1 A, 1.31 VA @ 3 A.

### Output Contacts

#### Standard:

Per **IEC 255-0-20 : 1974**, using the simplified method of assessment

6 A continuous carry

30 A make per **IEEE C37.90 : 1989**

100 A for one second

270 Vac/360 Vdc MOV for differential surge protection.

Pickup time: < 5 ms

Dropout time: < 8 ms

Breaking Capacity (L/R = 40 ms):

48 V	0.5 A	10,000 operations
------	-------	-------------------

125 V	0.3 A	10,000 operations
-------	-------	-------------------

250 V	0.2 A	10,000 operations
-------	-------	-------------------

Cyclic Capacity (L/R = 40 ms):

48 V	0.5 A	2.5 cycles per second
------	-------	-----------------------

125 V	0.3 A	2.5 cycles per second
-------	-------	-----------------------

250 V	0.2 A	2.5 cycles per second
-------	-------	-----------------------

#### High-current interrupting option:

6 A continuous carry

30 A make per **IEEE C37.90 : 1989**

330 Vdc MOV for differential surge protection

Pickup time: < 5 ms

Dropout time: < 8 ms

Breaking Capacity: 10 A 10,000 operations

48 and 125 V	(L/R = 40 ms)
--------------	---------------

250 V	(L/R = 20 ms)
-------	---------------

Cyclic Capacity: 10 A 4 cycles in 1 second, followed by 2 minutes  
idle for thermal dissipation

48 and 125 V	(L/R = 40 ms)
--------------	---------------

250 V	(L/R = 20 ms)
-------	---------------

**Note:** Do not use high-current interrupting output contacts to switch ac control signals. These outputs are polarity dependent.

**Fast high-current interrupting option:**

6 A continuous carry

30 A make per *IEEE C37.90 : 1989*

330 Vdc MOV for differential surge protection

Pickup time: < 200  $\mu$ s

Dropout time: &lt; 8 ms (typical)

Breaking Capacity: 10 A 10,000 operations

48 and 125 V (L/R = 40 ms)

250 V (L/R = 20 ms)

Cyclic Capacity: 10 A 4 cycles in 1 second, followed by 2 minutes idle for thermal dissipation

48 and 125 V (L/R = 40 ms)

250 V (L/R = 20 ms)

**Note:** Fast high-current interrupting output contacts are not polarity dependent.See *Appendix I* for further details.**Optoisolated  
Input Ratings****Standard fixed inputs** (operating voltage shown, nominal input current is 4 mA):

24 Vdc: 15 - 30 Vdc

48 Vdc: 30 - 60 Vdc

125 Vdc: 80 - 150 Vdc

250 Vdc: 150 - 300 Vdc

**Fixed level-sensitive inputs** (nominal input current is 4 mA):

48 Vdc: on for 38.4 - 60 Vdc; off below 28.8 Vdc

125 Vdc: on for 105 - 150 Vdc; off below 75 Vdc

250 Vdc: on for 200 - 300 Vdc; off below 150 Vdc

**Time-Code Input**

Relay accepts demodulated IRIG-B time-code input

**Communications**

Two rear panel and one front-panel EIA-232 serial communications ports.

**Power Supply**

125/250 V: 85 - 350 Vdc or 85 - 264 Vac; 12 watts

**Optional  
Power Supply**

24/48 V: 20 - 60 Vdc; 12 watts

**Dimensions**

One I/O Board: 5.22" H x 19" W x 11.66" D (133 mm x 483 mm x 296 mm)

Two I/O Boards: 6.97" H x 19" W x 11.66" D (177 mm x 483 mm x 296 mm)

**Dielectric  
Strength**

V, I inputs: 2500 Vac for 10 seconds

Other: 3000 Vdc for 10 seconds (excludes EIA-232)

**Operating Temp.**

-40° to 185°F (-40° to +85°C)

**Environment***IEC 68-2-30* Temperature/Humidity Cycle Test - six day (type tested)**Interference  
Tests***IEEE C37.90* SWC Test (type tested)*IEC 255-22-1* 1 MHz Burst Disturbance (type tested)*IEC 801-4* Electrical Fast Transient/Burst (type tested)

<b>Impulse Tests</b>	<p><b>IEC 255-5</b> 0.5 joule 5000 volt test (type tested)  <b>IEC 1000-4-5</b> Installation Class 4 (type tested)*</p> <p>* <b>Note:</b> Using the following communications cables:  SEL-C274, SEL-C274 FZ/FD (without IRIG)  SEL-C238, SEL-C238 FZ/FD (with IRIG)</p>
<b>RFI Tests</b>	<p><b>IEEE C37.90.2 IEEE Trial-Use Standard, Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.</b></p> <p>10 V/M.</p> <p><u>Exceptions:</u>  5.5.2 (2) Performed with 200 frequency steps per octave  5.5.3 <i>Digital Equipment Modulation Test</i> not performed  5.5.4 Test signal turned off between frequency steps to simulate keying</p> <p><b>IEC 255-22-3</b> Radiated EMI Test (type tested)</p> <p><u>Exception:</u>  4.3.2.2 Frequency sweep approximated with 200 frequency steps per octave</p>
<b>Vibration and Shock Test</b>	<p><b>IEC 255-21-1</b> and <b>-2</b>, Class 1 Test (type tested)</p> <p><u>Exception:</u>  4.1.4 Vibration Response Amplitude Tolerance increased to <math>\pm 25\%</math> (Two I/O board version - rear-panel plug-in connectors option only)</p>
<b>ESD Test</b>	<p><b>IEC 801-2</b> Electrostatic Discharge Test (type tested)  Severity Level: 3</p>
<b>Weight</b>	<p>One I/O Board: 20 lbs (9.1 kg); shipping weight 32 lbs (14.5 kg)  Two I/O Boards: 26.5 lbs (12 kg); shipping weight 40.6 lbs (18.5 kg)</p>

## Relay Element Ranges

<b>Phase Mho Distance</b>	Secondary Reach Setting Range:	0.05 - 64 $\Omega$ at the line angle
<b>Ground Mho Distance</b>	Secondary Reach Setting Range: $ k_{01} $ and $ k_0 $ setting range*: Angle $k_{01}$ and $k_0$ setting range*:	0.05 - 64 $\Omega$ at the line angle 0 - 4 $\pm 180^\circ$ in $0.1^\circ$ steps
Zone 1 zero-sequence factor $k_{01}$ is independent of $k_0$ factor for all other zones.*		
* <b>Note:</b> Same setting applies to Quadrilateral Ground Distance.		
<b>Quadrilateral Distance</b>	Secondary Reactive Reach: Secondary Resistive Reach: Nonhomogeneous Factor (T, degrees):	0.05 - 64 $\Omega$ 0.05 - 50 $\Omega$ $\pm 20^\circ$ in $0.1^\circ$ steps
<b>Out-of-Step Distance</b>	Secondary Reactance Setting Range: Secondary Resistance Setting Range:	$\pm 96 \Omega$ $\pm 70 \Omega$
<b>Load Encroachment Detection</b>	Secondary Impedance Setting Range: Forward Load Angle Setting (in degrees): Reverse Load Angle Setting (in degrees):	0.05 - 64 $\Omega$ $-90^\circ$ to $+90^\circ$ $+90^\circ$ to $270^\circ$
<b>Distance Element Accuracy</b>	Secondary Steady-State Error: $\pm 5\%$ of set reach $\pm 0.01 \Omega$ at line angle (LA) for $V > 5 \text{ V}$ and $I > 2 \text{ A}$ $\pm 10\%$ of set reach $\pm 0.01 \Omega$ at LA for $1 \text{ V} < V < 5 \text{ V}$ and $1 \text{ A} < I < 2 \text{ A}$  Transient Overreach Error: $\pm 5\%$ of set reach, plus steady-state error	
<b>Negative-Sequence Directional Element</b>	Secondary Positive-Sequence Current Restraint Range: Secondary Forward Directional Current Supervision: Secondary Reverse Directional Current Supervision: Secondary Forward Directional Impedance Setting: Secondary Reverse Directional Impedance Setting:	0.02 - 0.5 0.25 - 5 A 0.25 - 5 A $\pm 64 \Omega$ $\pm 64 \Omega$
<b>Supervisory Overcurrent</b>		
Phase	Secondary Pickup Setting Range: • Supervises ground distance	0.5 - 100 A, $\pm 0.05 \text{ A}$ , $\pm 3\%$ of setting
Phase-to-Phase	Secondary Pickup Setting Range: • Supervises phase distance	1.0 - 170 A, $\pm 0.05 \text{ A}$ , $\pm 3\%$ of setting
Positive-Sequence	Secondary Pickup Setting Range: • Supervises OOS logic	1.0 - 100 A, $\pm 0.05 \text{ A}$ , $\pm 3\%$ of setting
Residual	Secondary Pickup Setting Range: Transient Overreach: • Supervises ground distance	0.5 - 100 A, $\pm 0.05 \text{ A}$ , $\pm 3\%$ of setting $\pm 5\%$ of pickup

**Directional  
Time-Overcurrent**

Selectable Curve Shape: Moderately inverse (US) or Longtime Standby (IEC)  
Inverse (US) or Standard Inverse (IEC)  
Very Inverse (US or IEC)  
Extremely Inverse (US or IEC)

Phase Pickup setting range: 0.5 A - 16 A,  $\pm 0.05$  A,  $\pm 3\%$  of setting  
Neg.-Seq. pickup setting range: 0.5 A - 16 A,  $\pm 0.05$  A,  $\pm 3\%$  of setting  
Residual Pickup setting range: 0.5 A - 16 A,  $\pm 0.05$  A,  $\pm 3\%$  of setting  
Time Dial setting range: 0.5 - 15 in 0.01 steps (US)  
0.05 - 1 in 0.01 steps (IEC)

Timing:  $\pm 4\%$  and  $\pm 1.5$  cycles for current magnitudes between 2 and 20 multiples of pickup.

**Nondirectional  
Residual/Neg.-Seq.  
Overcurrent**

Secondary Pickup setting range: 0.25 - 80 A,  $\pm 0.05$  A,  $\pm 3\%$  of setting  
Transient Overreach:  $\pm 5\%$  of pickup

**Overvoltage**

Pickup: 0 - 150 V,  $\pm 5\%$  of setting,  $\pm 1$  V  
Transient Overreach:  $\pm 5\%$  of pickup

**Undervoltage**

Pickup: 0 - 100 V,  $\pm 5\%$  of setting,  $\pm 1$  V  
Transient Overreach:  $\pm 5\%$  of pickup

**Miscellaneous  
Timers**

**Step Distance**

Time Delay: 0 - 2000 cycles

**Communications Scheme**

Time Delay: 0 - 2000 cycles

**DCB Carrier Coordination**

Time Delay: 0 - 60 cycles

**Short Delay**

Time Delay: 0 - 2000 cycles

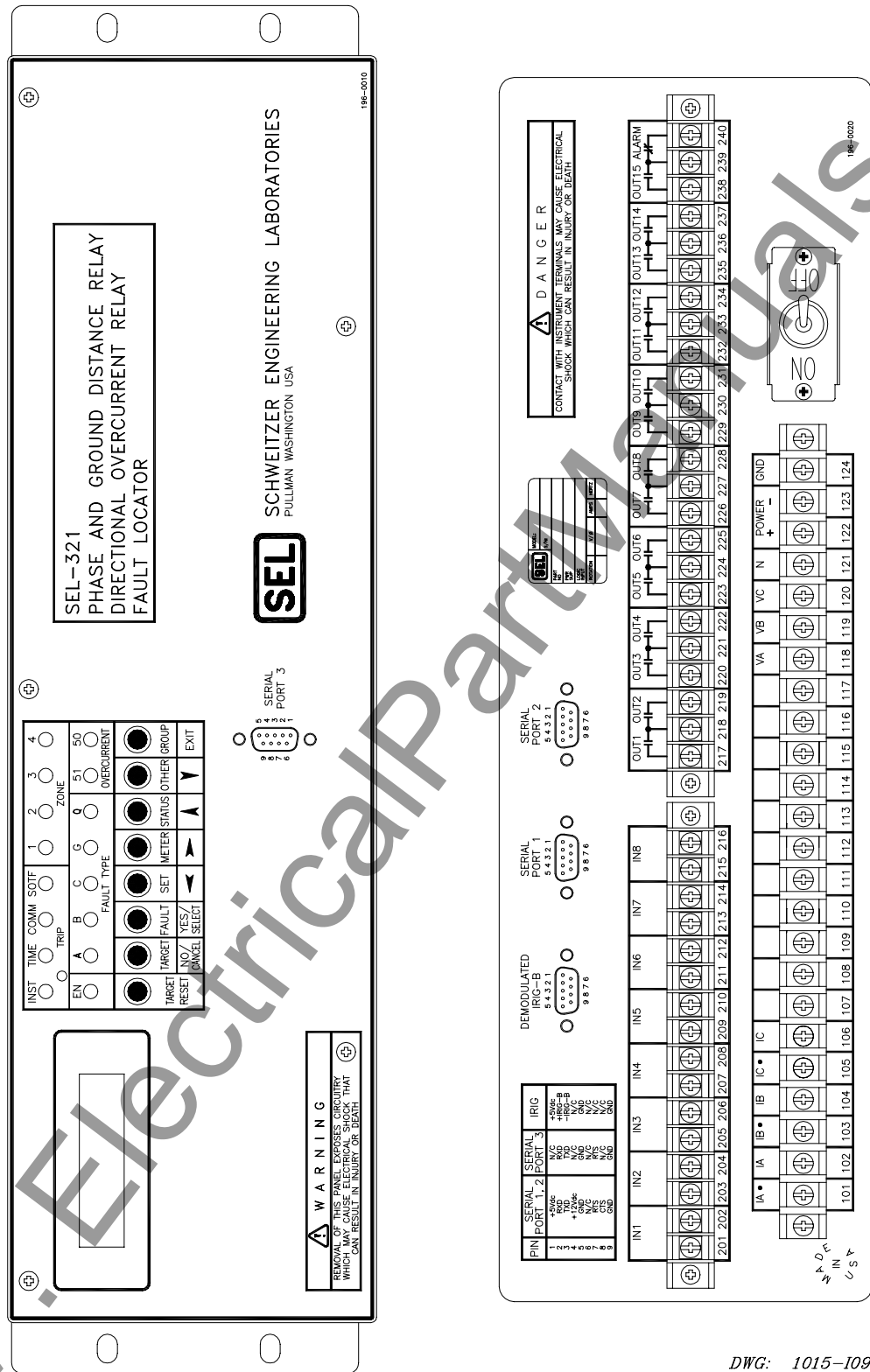
**Long Delay**

Time Delay: 0 - 8000 cycles

**Loss-of-Potential Set**

Time Delay: 1 - 60 cycles

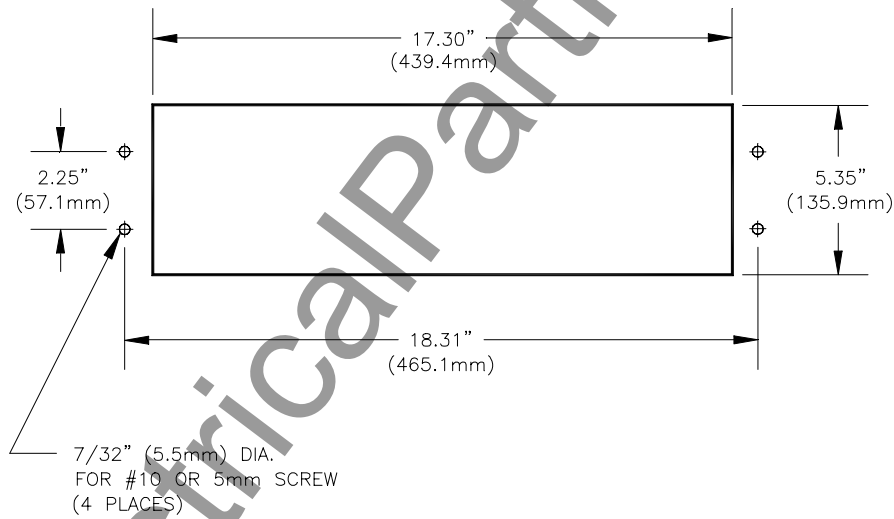
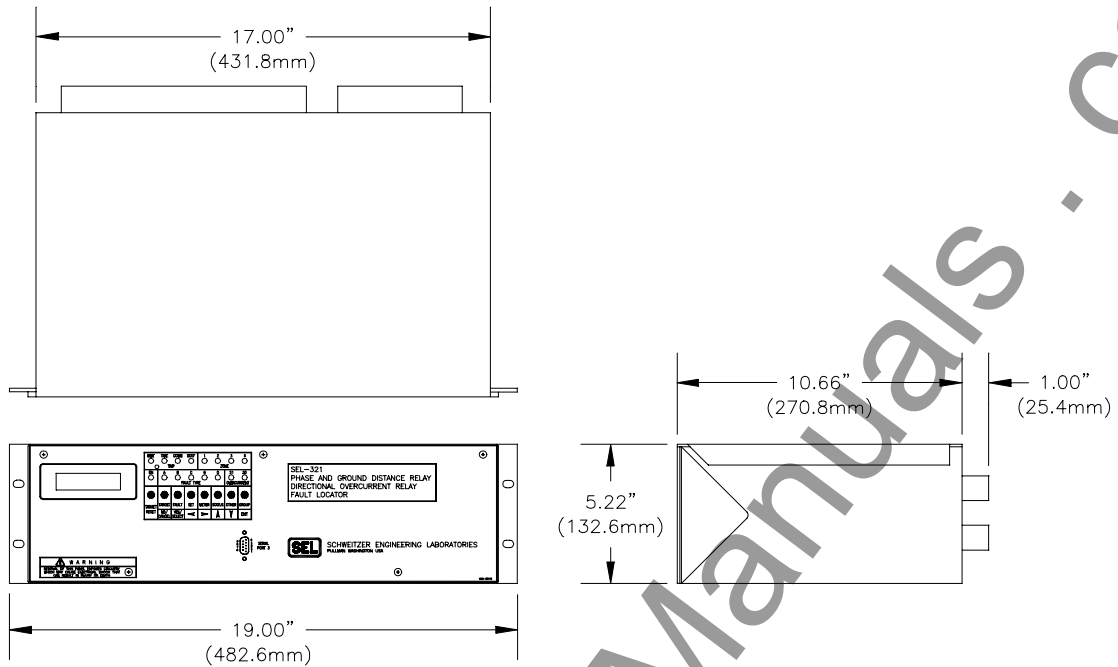
PANEL DRAWINGS AND MOUNTING



DWG: 1015-109

Figure 9: SEL-321 Relay Horizontal Front and Rear Panel Drawings (One I/O Board Version; 8 isolated outputs shown – other options are available)

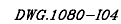




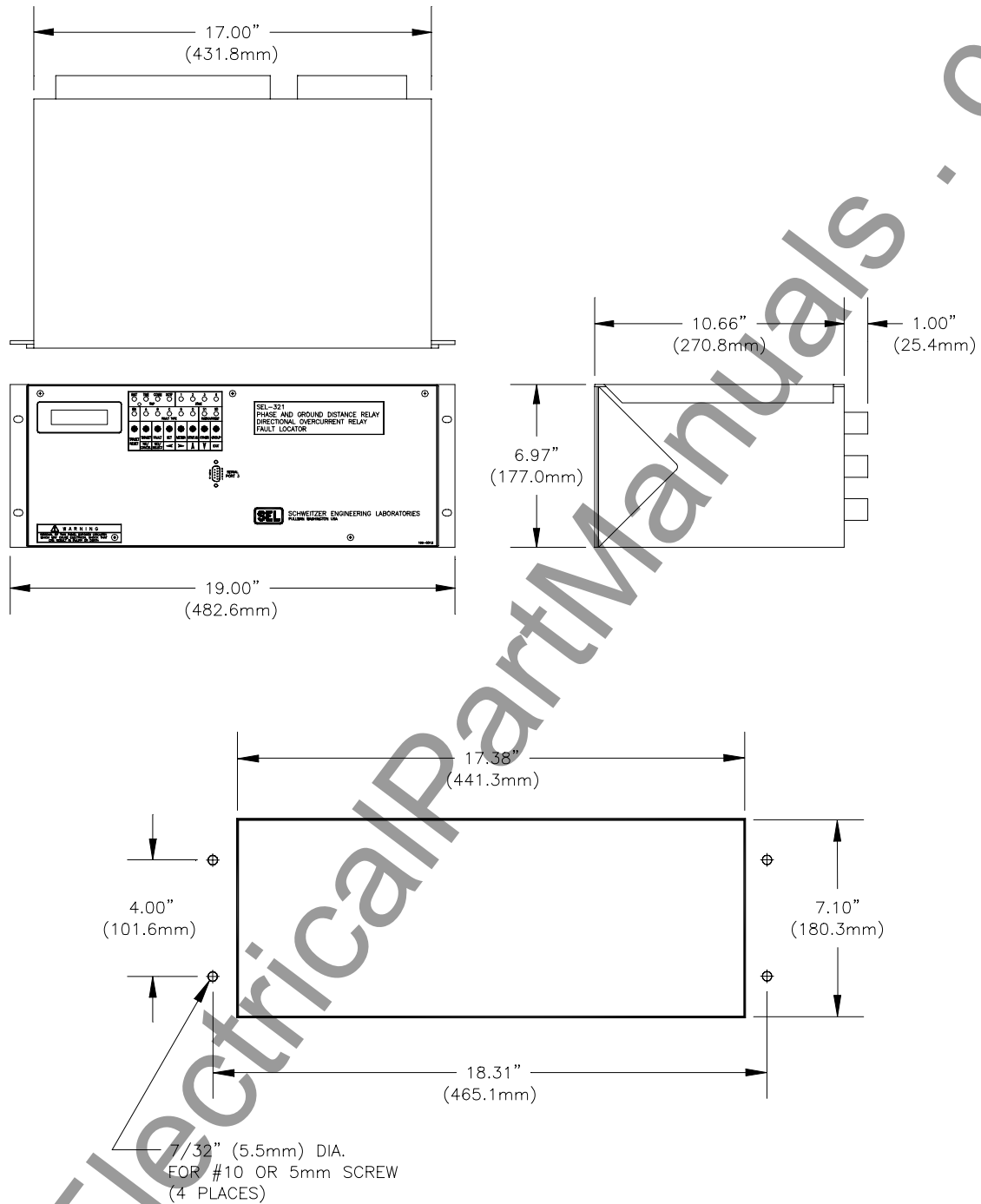
NOTE: ALL INSTRUMENTS MAY BE MOUNTED HORIZONTALLY (AS SHOWN) OR VERTICALLY

DWG. 1015-I08

**Figure 10: Relay Dimensions, Panel Cutout, and Drill Plan (Single I/O Board Version)**



18



DWG.1080-103

**Figure 12: SEL-321 Relay Dimensions, Panel Cutout, and Drill Plan (Two I/O Board Version)**

## FACTORY ASSISTANCE

The employee-owners of Schweitzer Engineering Laboratories are dedicated to making electric power safer, more reliable, and more economical.

We appreciate your interest in SEL products, and we are committed to making sure you are satisfied. If you have any questions, please contact us at:

Schweitzer Engineering Laboratories  
2350 NE Hopkins Court  
Pullman, WA USA 99163-5603  
Tel: (509) 332-1890  
Fax: (509) 332-7990

We guarantee prompt, courteous, and professional service.

We appreciate receiving any comments and suggestions about new products or product improvements that would help us make your job easier.

All brand or product names appearing in this document are the trademark or registered trademark of their respective holders.

Schweitzer Engineering Laboratories, SELoGic, Connectorized, and **SEL** are registered trademarks of Schweitzer Engineering Laboratories.

This product is covered by U.S. Patent Nos: 4,996,624; 5,041,737; 5,208,545; 5,262,679; 5,317,472; 5,325,061; 5,349,490; 5,365,396; 5,367,426; 5,479,315; 5,515,227; 5,349,490; 5,790,418; 5,793,750; Foreign Patents issued and other U.S. and Foreign Patents Pending.

Copyright © SEL 1992, 1993, 2000 (All rights reserved) Printed in USA.

SEL-321 Data Sheet

Date Code 20000410



**SCHWEITZER ENGINEERING LABORATORIES**

2350 NE Hopkins Court • Pullman, WA 99163-5603 USA

Phone: (509) 332-1890 • Fax: (509) 332-7990

Internet: [www.selinc.com](http://www.selinc.com) • E-mail: [info@selinc.com](mailto:info@selinc.com)